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Drosophilidae (Diptera) in Burma

III. The Subgenus *Drosophila*, Excepting the *D. immigrans* Species-group

Masanori J. TODA

Institute of Low Temperature Science, Hokkaido
University, Sapporo, 060 Japan

Abstract Six new and seven known species of the subgenus *Drosophila* are reported from Burma.

TODA (1986) reported eighteen species of the *Drosophila immigrans* species-group from Burma. This paper deals with thirteen species of the subgenus *Drosophila* other than the *immigrans* group, based on the material collected by the author himself in 1981–1982 from Burma.

Drosophila polychaeta Species-group

D. polychaeta species-group: STURTEVANT, 1942, Univ. Texas Publ., (4213): 31.

Diagnosis. Reddish brown species with 3 or 4 pairs of postsutural dorsocentral bristles and large aedeagus. 4V-index 1.7 to 2.2. Ventral receptacle relatively short and loosely coiled (KUMAR & GUPTA, 1985).

Drosophila (Drosophila) bivibrissae sp. nov.

(Figs. 1–4)

Diagnosis. Second oral bristle stout, longer (ca. 1.2) than vibrissa. Acrostichal hairs in 6 rows. Surstylus with 7 or 8 primary teeth, dorsally with large, quadrate, pubescent flap (Fig. 2).

♂. Thorax length (including scutellum) ca. 1.0 mm.

Head: Eye with thick pile. Antenna yellowish brown. Arista with 4 upper and 2 lower branches in addition to terminal fork. Frons slightly narrower than 1/2 of head width (0.47, measured at level of anterior ocellus), yellowish brown, medially to anteriorly with frontal hairs; ocellar triangle darker. Anterior reclinate orbital ca. 3/5 (0.61) length of posterior reclinate; proclinate ca. 5/6 (0.84) length of posterior reclinate. Face yellowish brown, pale in lower portion; carina high, broad below. Clypeus yellowish brown. Cheek yellowish brown, ca. 1/5 (0.19) as broad as maximum diameter of eye. Palpus pale yellow, club-shaped, with numerous setae.

Thorax: Mesoscutum, scutellum and thoracic pleura yellowish brown; sterno-episternum paler. Humeral 2; upper one longer. One extra pair of dorsocentrals present in front of usual anteriors. Several bristles in row of dorsocentrals and in 1st row lateral to dorsocentrals somewhat longer than other acrostichal hairs. First dorsocentrals ca. $2/5$ (0.40), 2nd ca. $5/7$ (0.71) length of 3rd; length distance from 1st to 2nd ca. $3/10$ (0.31), distance from 2nd to 3rd ca. $1/2$ (0.52) cross distance between 2nds. Anterior scutellars as long (1.01) as posteriors; posteriors nearer to each other than to anteriors. Sterno-index ca. 0.8.

Legs pale yellow. Preapicals on all tibiae; apicals on fore and mid tibiae. Fore metatarsus as long as 3 succeeding tarsal joints together; mid and hind metatarsi as long as rest together.

Wing hyaline, somewhat fuscous. Veins brownish yellow; cross veins clear. R_{2+3} slightly curved to costa at tip; R_{4+5} and M slightly approaching each other in submedian portion. Cl-bristles 2. Wing indices: C ca. 1.8, 4V ca. 2.2, 4C ca. 1.4, 5x ca. 1.5, Ac ca. 2.9, C3-fringe ca. 0.8. Halteres dark grayish brown.

Abdomen: Tergites nearly entirely dark brown. Sternites pale yellow.

Periphallic organs (Figs. 1-2): Epandrium pubescent except ventral and anterosubmedian portions, with ca. 30 bristles in lower part, narrow in submedian to upper part; caudal margin of lower part expanding quadrangularly, covering surstylus; toe hook-like in shape, apically pointed, with several short bristles. Surstylus with ca. 4 setae at caudoventral corner and ca. 4 on inner surface. Cercus oval, nearly entirely pubescent, separate from epandrium, with ca. 50 long bristles; caudoventral corner somewhat pointed, with tuft of short bristles.

Phallic organs (Figs. 3-4): Aedeagus T-shaped in lateral view, serrate on basal lateral margins; apodeme shorter than half length of aedeagus. Anterior paramere small, oval, without sensilla. Posterior paramere absent. Novasternum without submedian spines.

Holotype ♂, Burma: Rangoon, 17. XII. 1981, by sweeping at cliff shelters and ditches; deposited in the Entomological Institute, Hokkaido University, Sapporo, Japan (EHU).

Distribution. Burma: Rangoon.

Relationship. This species is closely related to *D. polychaeta* PATTERSON et WHEELER, 1942, but clearly distinguishable from the latter by the diagnostic characters.

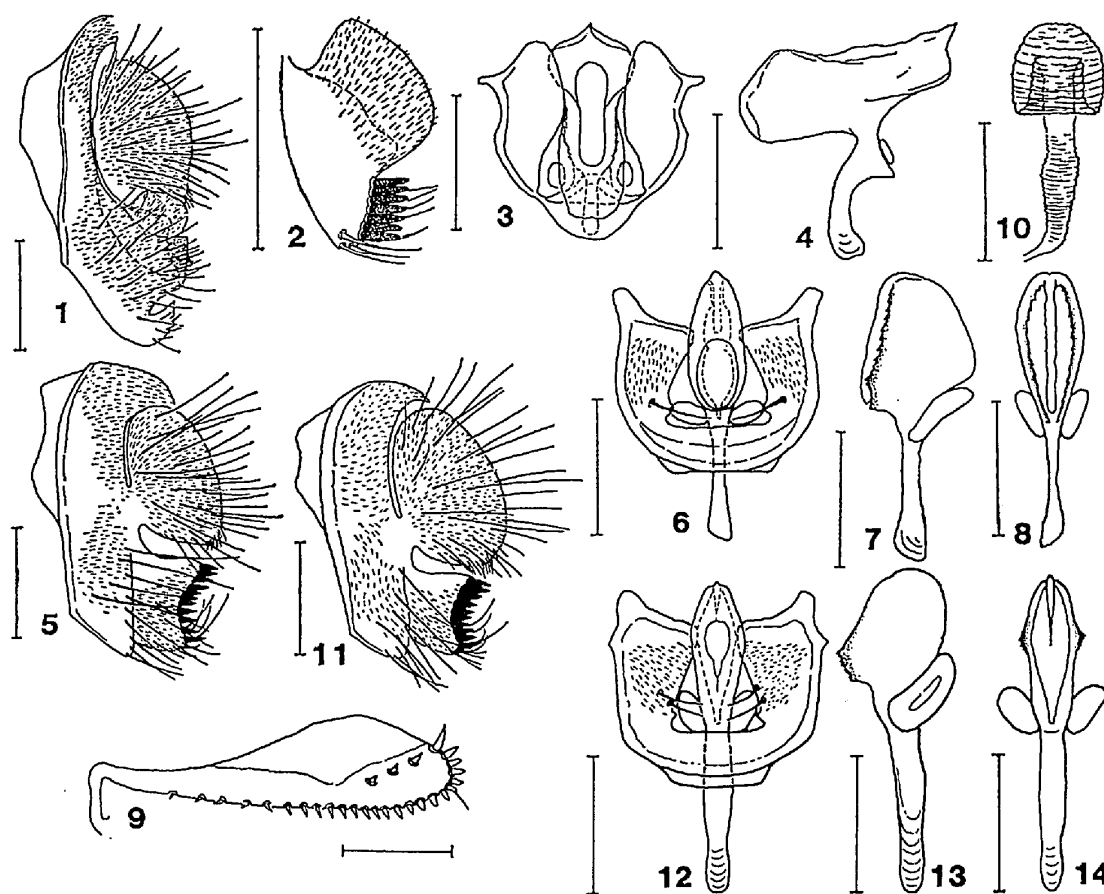
Drosophila robusta Species-group

D. robusta species-group: STURTEVANT, 1942, Univ. Texas Publ., (4213): 31.

Drosophila (Drosophila) lacertosa OKADA

Drosophila (Drosophila) lacertosa OKADA, 1956, Syst. Study, 158.

Specimen examined. Burma: 1 ♂, Pyin Oo Lwin (previously cited as Maymyo),



Figs. 1-14. — 1-4, *Drosophila (Drosophila) bivibrissae* sp. nov.; 5-10, *D. (D.) longiserrata* sp. nov.; 11-14, *D. (D.) bisetata* sp. nov. — 1, 5, 11: Peripheral organs; 2: surstylus; 3, 6, 12: phallic organs (ventral view); 4, 7, 13: aedeagus (lateral view); 8, 14: ditto (dorsal view); 9: ovipositor; 10: spermatheca. (Scale-line=0.1 mm.)

30. XII. 1981-6. I. 1982, ex trap.

Distribution. Japan, Korea, Taiwan, Nepal, India; Burma (n. loc.): Pyin Oo Lwin.

Drosophila melanica Species-group

D. melanica species-group: STURTEVANT, 1942, Univ. Texas Publ., (4213): 31.

Diagnosis. Blackish species. Arista with 7 to 8 branches including terminal fork. Sterno-index 0.7 to 0.8.

Drosophila (Drosophila) longiserrata sp. nov.

(Figs. 5-10)

Diagnosis. Aedeagus dorsally with sclerotized, broad, long process between 2 outer lobes; dorsal margin of outer lobe serrate along nearly entire length (Figs.

7-8). Novasternum with 1 pair of submedian spines (Fig. 6). Fore metatarsus as long as 2 succeeding tarsal joints together; mid and hind metatarsi as long as 3 succeeding together. Outer capsule of spermatheca entirely wrinkled transversely (Fig. 10). Posterior scutellar bristles nearer to each other than to anteriors.

♂, ♀. Body length, ♀ ca. 2.7 mm. Thorax length, ♂ ca. 1.2 mm, ♀ ca. 1.3 mm.

Head: Eye brownish red, with thick pile. Antenna dark grayish brown. Arista with 3 upper and 2 lower branches in addition to terminal fork. Frons ca. $1/2$ (0.51) as wide as head, dark brown, anteriorly with frontal hairs; ocellar triangle, its surrounding area and periorbits blackish. Anterior reclinate orbital ca. $2/5$ (mean=0.39, range: 0.38-0.39) length of posterior reclinate; proclinate ca. $4/5$ (0.81, 0.76-0.85) length of posterior reclinate. Face dark brown; carina broad. Clypeus dark brown. Cheek grayish brown, ca. $1/4$ (0.25, 0.24-0.25) as broad as maximum diameter of eye. Second oral ca. $1/2$ (0.51, 0.45-0.56) length of vibrissa. Palpus grayish brown, with a few prominent setae.

Thorax nearly entirely blackish brown. Humerals 2, subequal. Acrostichal hairs in 6 rows. Anterior dorsocentrals ca. $7/10$ (0.70, 0.67-0.72) length of posteriors; cross distance of dorsocentrals ca. 1.8 (1.72-1.81) length distance. Anterior scutellars ca. $5/6$ (0.83, 0.80-0.85) length of posteriors. Sterno-index ca. 0.7 (0.68-0.72).

Legs yellowish brown; femora darker. Preapicals on all tibiae; apicals on fore and mid tibiae.

Wing hyaline, slightly fuscous. Veins yellowish brown; cross veins clear. R_{2+3} slightly curved to costa at tip; R_{4+5} and M nearly parallel. C1-bristles 2. Wing indices: C ca. 3.1 (2.99-3.12), 4V ca. 1.7 (1.65-1.78), 4C ca. 0.85 (0.84-0.86), 5x ca. 1.1 (1.05-1.18), Ac ca. 1.9 (1.74-2.02), C3-fringe ca. 0.3 (0.24-0.31). Halteres white, with partly brownish stalk.

Abdomen: ♂ tergites nearly entirely dark brown; sternites pale grayish brown. ♀ tergites pale yellow; 1st tergite nearly entirely grayish brown; 2nd to 4th tergites each with broad, medially interrupted, dark brown, caudal band extending forward on lateral margins; 5th tergite with medially uninterrupted, caudal band extending forward on lateral margins; 6th tergite with uninterrupted, caudal band not reaching lateral margins; sternites pale yellow.

Periphallic organs (Fig. 5): Epandrium pubescent except for ventral and antero-submedian portions, with ca. 11 bristles in lower part, obliquely truncate below; anterior and posterior margins nearly parallel; toe pointed. Surstylus quadrate, pubescent except for dorsal portion, with ca. 11 primary teeth in concave row on entire length of distal margin, several straight setae on submedian to ventral outer surface and several curved setae on ventral inner surface. Cercus oval, entirely pubescent, fused to epandrium, with ca. 25 long bristles and tuft of short bristles at caudoventral corner.

Phallic organs (Figs. 6-8): Aedeagus dorsally bilobed, ventrally with elliptical

opening, shaped racket-like in lateral view; apodeme as long as aedeagus. Anterior paramere elongated ellipsoid, without sensilla. Posterior paramere absent. Novasternum broad, somewhat quadrate, deeply and widely notched, pubescent in lateral portions.

♀ Reproductive organs: Ovipositor (Fig. 9) narrow, apically round, with ca. 25 marginal and ca. 3 discal teeth; ultimate marginal tooth longest; basal ithmus short, narrow. Spermatheca (Fig. 10) basally not narrowing, somewhat quadrate in lateral view; introvert entirely wrinkled; duct broad, distally slightly expanded.

Holotype ♂, Burma: Pyin Oo Lwin, 30. XII. 1981–6. I. 1982, ex trap; in EHU. Paratype, Burma: 1 ♀, same data as holotype; in EHU.

Distribution. Burma: Pyin Oo Lwin.

Relationship. This species is very close to *D. pengi* OKADA et KUOKAWA, 1957. The diagnostic differences from the latter are seen only in aedeagus, spermatheca and fore metatarsus, i.e., in *D. pengi*: aedeagus dorsally with narrow, short process between outer lobes, dorsal margin of outer lobe serrate only in basal part; outer capsule of spermatheca transversely wrinkled only in basal part; fore metatarsus slightly longer than 2 succeeding tarsal joints together.

***Drosophila (Drosophila) bisetata* sp. nov.**

(Figs. 11–14)

Diagnosis. Novasternum with 2 pairs of submedian spines (Fig. 12). Aedeagus dorsally with narrow, moderately long process between 2 outer lobes; dorsal margin of outer lobe serrate only in basal part (Figs. 13–14). Posterior scutellar bristles equidistant from each other and from anteriors. Fore metatarsus as long as 2 succeeding tarsal joints together; mid and hind metatarsi slightly shorter than 3 succeeding together.

This species is very close to the foregoing species, *D. longiserrata*. The following description is made referring only to the differences from the latter.

♂. Body length ca. 2.7 mm.

Head: Frons width ca. 1/2 (0.50) of head width. Anterior reclinate ca. 3/8 (0.37) length of posterior reclinate; proclinate ca. 4/5 (0.82) length of posterior reclinate. Cheek width ca. 1/4 (0.26) of maximum diameter of eye. Second oral ca. 3/10 (0.30) length of vibrissa.

Thorax: Anterior dorsocentrals ca. 4/5 (0.79) length of posteriors; cross distance of dorsocentrals ca. 1.7 length distance. Anterior scutellars ca. 9/10 (0.94) length of posteriors.

Wing indices: C ca. 2.9, 4V ca. 2.1, 4C ca. 1.0, 5x ca. 1.3.

Periphallic and phallic organs (Figs. 11–14): Epandrium with ca. 9 bristles in lower part; toe somewhat round. Surstylus with ca. 10 primary teeth. Aedeagus ventrally with somewhat irregularly shaped opening.

Holotype ♂, Burma: Pyin Oo Lwin, 30. XII. 1981–6. I. 1982, ex trap; in EHU.

Distribution. Burma: Pyin Oo Lwin.

Relationship. This species is closely related to the foregoing species, *D. longiserrata*, and *D. pengi*, but clearly distinguishable from the latter by having 2 pairs of submedian spines on novasternum (the latter two species having 1 pair of submedian spines). Thus, these three species can be distinguished from one another by the diagnostic characters, though they are very similar in general appearance. For the sake of making the identification easier, some quantitative characters in which interspecific differences are seen among the three species are summarized below:

	<i>bisetata</i> (<i>n</i> =1 ♂)	<i>longiserrata</i> (<i>n</i> =1 ♂, 1 ♀)	<i>pengi</i> (<i>n</i> =10 ♂, 10 ♀)*
2nd oral/vibrissa	0.30	0.45–0.56	0.34–0.63
4V-index	2.05	1.65–1.78	1.41–1.83
4C-index	0.97	0.84–0.86	0.67–0.88
5x-index	1.34	1.05–1.18	1.02–1.28

* All collected from Hokkaido, northern Japan.

Drosophila bisetata may be distinguishable from the other two also by these quantitative characters. Another species of the *D. melanica* species-group, *D. afer* TAN, HSU et SHENG, 1949, was reported from southern China. According to the description by TAN *et al.* (1949), not referring to ♂ genitalia, this species also seems very close to the three species concerned here, but having only one diagnostic difference from the latter, i.e., "Middle orbital about 2/3 other two." However, there remains a doubt whether *D. afer* may or may not be conspecific to any one of the three species, until *D. afer* is re-examined, especially for ♂ genitalia, in the light of the present knowledge on the taxonomy of this species-group.

Drosophila bizonata Species-group

D. bizonata species-group: TAN *et al.*, 1949, 203.

Diagnosis. Anterior reclinate orbital bristle minute. Second oral bristle long. Palpus with a few prominent setae. Cheek ca. 1/5 as broad as maximum diameter of eye. Acrostichal hairs in 6 rows. Sterno-index ca. 0.5–0.6. Posterior paramere forming broad distal bow.

Drosophila (Drosophila) bizonata KIKKAWA et PENG

(Fig. 15)

Drosophila bizonata KIKKAWA et PENG, 1938, Jpn. J. Zool., 7: 532.

Drosophila (Drosophila) bizonata: WHEELER, 1949, Univ. Texas Publ., (4920): 190; OKADA, 1955, Kontyû, Tokyo, 23: 98; 1956, Syst. Study, 135.

Spermatheca (Fig. 15) ellipsoidal, basally narrowing and transversely wrinkled,

apically indented; basal introvert deep; duct submedially expanded in introvert.

Specimens examined. Burma: 306 ♂, 363 ♀, Pyin Oo Lwin, 30. XII. 1981–6. I. 1982, ex traps; 9 ♂, 14 ♀, Mandalay, 26. XII. 1981–4. I. 1982, ex traps; 2 ♀, Rangoon, 11–15. I. 1982, ex traps. East Nepal: 1 ♂, Taplejung District, old mixed forest above Sangu, c. 6,200', 25–28. X. 1961 (R. L. Coe).

Distribution. Japan, Korea, Ryukyus, Nepal (n. loc.); Burma (n. loc.): Pyin Oo Lwin, Mandalay, Rangoon.

Remarks. One ♂ specimen deposited in Tokyo Metropolitan University as a paratype of *D. trizonata* OKADA, 1966, was re-examined and confirmed to be *D. bizonata* (misidentified).

Drosophila (Drosophila) trizonata OKADA

(Figs. 16–20)

Drosophila (Drosophila) trizonata OKADA, 1966, Bull. Brit. Mus. (Nat. Hist.), (Ent. Suppl.), 6: 97.

Diagnosis. Aedeagus long, slender, distally not dilated, gently curved ventrad, ventrosubapically (ca. 1/4 from apex) with 1 pair of marginally serrate flaps, dorso-subapically (ca. 1/4 from apex) with 1 pair of small flaps; aedeagal apodeme as long as aedeagus (Fig. 18). Cercus with tuft of several short, stout bristles at caudo-ventral corner (Fig. 16). Ovipositor apically round; sclerotized lobe slender, with dorsosubapical margin nearly parallel to ventral margin; basal isthmus ca. 1/4 as long as lobe (Fig. 19).

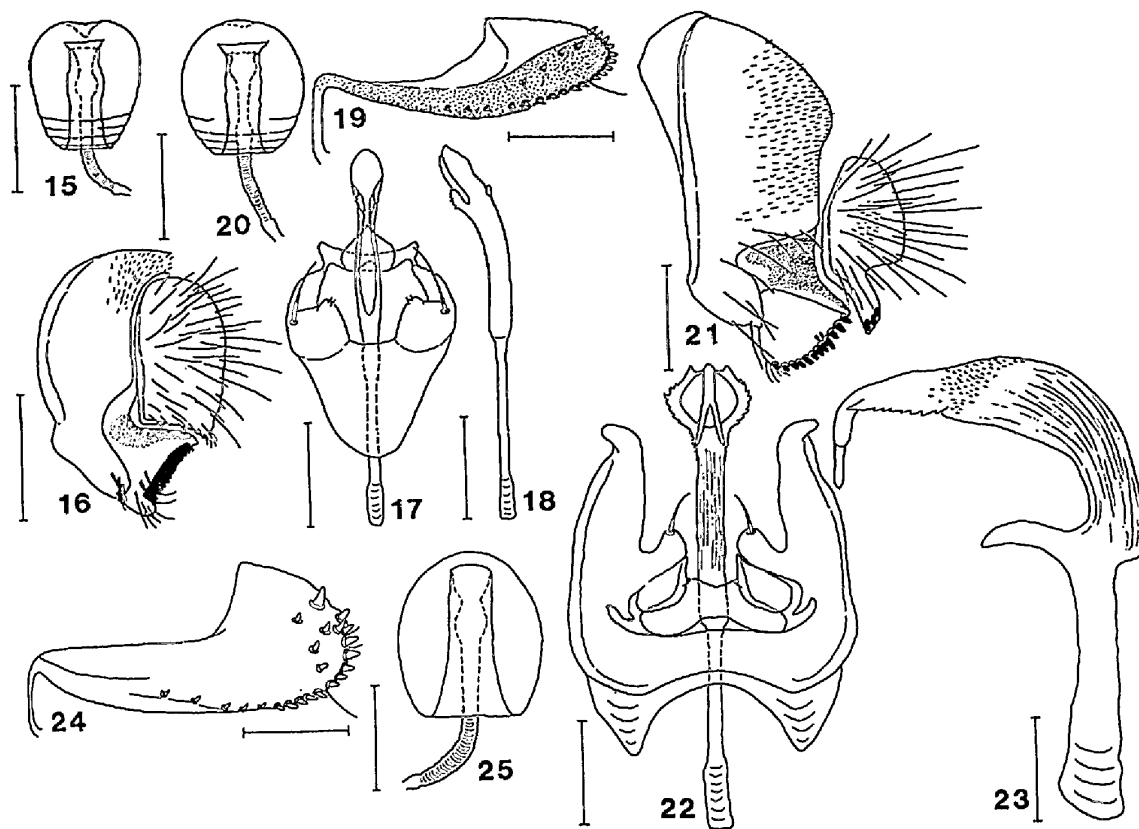
♂, ♀. Body length, ♂ ca. 1.9 mm (1.58–2.27, holotype 1.83), ♀ ca. 2.3 mm (2.05–2.52). Thorax length, ♂ ca. 1.0 mm (0.69–1.08, 0.96), ♀ ca. 1.1 mm (1.03–1.25).

Head: Arista with ca. 5 (4–6, 6) upper and ca. 2 (2–3, 2) lower branches in addition to terminal fork. Frons ca. 1/2 (0.51, 0.48–0.53, 0.50) as wide as head. Anterior reclinate orbital ca. 2/9 (0.22, 0.16–0.34, 0.25) length of posterior reclinate; proclinate ca. 7/9 (0.77, 0.67–0.97, 0.81) length of posterior reclinate. Carina high, broad. Cheek ca. 1/6 (0.18, 0.16–0.24, 0.17) as broad as maximum diameter of eye. Second oral ca. 8/9 (0.89, 0.76–1.03, 0.95) length of vibrissa.

Thorax: Anterior dorsocentrals ca. 2/3 (0.65, 0.48–0.75, 0.62) length of posteriors; cross distance of dorsocentrals ca. 2.3 (1.79–2.81, 1.79) length distance. Anterior scutellars slightly shorter (0.93, 0.80–0.98, 0.98) than posteriors. Sterno-index ca. 0.6 (0.52–0.77, 0.55).

Wing indices: C ca. 3.4 (3.14–3.89, 3.39), 4V ca. 1.7 (1.48–1.91, 1.66), 4C ca. 0.7 (0.63–0.85, 0.71), 5x ca. 1.4 (1.20–1.77, 1.60), Ac ca. 2.1 (1.87–2.46, 1.88), C3-fringe ca. 0.3 (0.22–0.37, 0.35).

Periphallic and phallic organs (Figs. 16–17): Epandrium apically with ca. 6 (4–8) strong, black, short bristles. Surstylus with ca. 14 (13–15) primary teeth. Cercus with ca. 38 (34–43) long bristles. Novasternum medially widely notched on distal margin.



Figs. 15–25. — 15, *Drosophila (Drosophila) bizonata* KIKKAWA et PENG, 1938; 16–20, *D. (D.) trizonata* OKADA, 1966; 21–25, *D. (D.) bifidiprocera* ZHANG et GAN, 1986. — 16, 21: Periphallic organs; 17, 22: phallic organs (ventral view); 18, 23: aedeagus (lateral view); 19, 24: ovipositor; 15, 20, 25: spermatheca. (Scale-line=0.1 mm.)

♀ Reproductive organs: Ovipositor (Fig. 19) with 3 or 4 discal and 19 or 20 marginal teeth. Spermatheca (Fig. 20) very similar to that of the foregoing species, *D. bizonata*; but outer capsule not so narrowing in lower part; duct expanded in distal part.

Specimens examined. Holotype ♂, East Nepal: Taplejung District, old mixed forest above Sangu, c. 6,200', 25–28. X. 1961 (R. L. COE); in the British Museum (Natural History) (BMNH). Paratypes, 1 ♂, 1 ♀, same data as holotype; in BMNH. Burma: 69 ♂, 74 ♀, Pyin Oo Lwin, 30. XII. 1981–6. I. 1982, ex traps; 1 ♀, Mandalay, 26. XII. 1981–4. I. 1982, ex trap.

Distribution. Nepal; Burma (n. loc.): Pyin Oo Lwin, Mandalay.

Relationship. This species is very close to the foregoing species, *D. bizonata*, but clearly distinguishable from the latter by the diagnostic characters.

Drosophila histrio Species-group

D. histrio species-group: OKADA, 1966, Bull. Brit. Mus. (Nat. Hist.), (Ent. Suppl.), 6: 99.

Diagnosis. Anterior reclinate orbital bristle minute or small, ca. $1/3$ – $1/5$ length of proclinate. Palpus with a few prominent setae. Posterior paramere apparently absent.

Drosophila (Drosophila) bifidiprocera ZHANG et GAN

(Figs. 21–25)

Drosophila (Drosophila) bifidiprocera ZHANG et GAN, 1986, Zool. Res., 7: 358.

Diagnosis. Surstylus with ca. 2 weak secondary teeth adjacent to row of primary teeth (Fig. 21). Aedeagus subapically flattened, dilated and with serrate lateral margins (Figs. 22–23). Anterior paramere partly fused to novasternum, with 1 sensillum (Fig. 22). Ovipositor with ca. 6 discal teeth (Fig. 24).

♂, ♀. Body length, ♂ ca. 2.8 mm (2.39–3.21), ♀ ca. 3.2 mm. Thorax length, ♂ ca. 1.4 mm (1.21–1.56), ♀ ca. 1.8 mm.

Head: Eye red, with pile. Antenna yellow; 3rd joint darker. Arista with ca. 6 (5–6) upper and 3 lower branches in addition to terminal fork. Frons ca. $1/2$ (0.50, 0.47–0.53) as wide as head, orange yellow, anteriorly with a few frontal hairs; ocellar triangle brownish yellow, especially darker on inside margins of ocelli; periorbits yellow. Anterior reclinate orbital ca. $1/3$ (0.32, 0.25–0.35) length of posterior reclinate; proclinate ca. $3/4$ (0.76, 0.71–0.81) length of posterior reclinate. Face brownish yellow; carina pale, high, broad below. Clypeus brown. Cheek orange yellow, ca. $1/5$ (0.21, 0.18–0.25) as broad as maximum diameter of eye. Second oral ca. $2/3$ (0.68, 0.56–0.78) length of vibrissa. Palpus yellow.

Thorax: Mesoscutum, scutellum and thoracic pleura brownish yellow; sternoepesternum paler. Humerals 2, subequal. Acrostichal hairs in 8 rows. Anterior dorsocentrals ca. $2/3$ (0.66, 0.59–0.74) length of posteriors; cross distance of dorsocentrals ca. 2.5 (2.28–2.58) length distance. Anterior scutellars ca. $9/10$ (0.91, 0.85–0.96) length of posteriors. Sterno-index ca. 0.7 (0.60–0.75).

Legs yellow. Preapicals on all tibiae; apicals on fore and mid tibiae. Fore metatarsus slightly shorter than 2 succeeding tarsal joints together; mid and hind metatarsi slightly longer than 3 succeeding together.

Wing hyaline, slightly fuscous. Veins brownish yellow; cross veins cloud. R_{2+3} slightly curved to costa at tip; R_{4+5} and M nearly parallel. C1-bristle 1. Wing indices: C ca. 3.9 (3.50–4.46), 4V ca. 1.6 (1.47–1.71), 4C ca. 0.6 (0.59–0.70), 5x ca. 1.2 (1.14–1.35), Ac ca. 1.8 (1.69–1.98), C3-fringe ca. 0.45 (0.42–0.49). Halteres pale yellow.

Abdomen: Tergites pale yellow; 2nd tergite with narrow, medially widely interrupted, brown, caudal band; 3rd and 4th tergites in ♂ and 3rd tergite in ♀ each with medially widely interrupted, laterally narrowing, dark brown, caudal band; ♂ 5th and 6th tergites nearly entirely black except for lateral parts. Sternites pale yellow.

Periphallic organs (Fig. 21): Epandrium submedially to dorsally broad,

black, pubescent on caudal half; lower part narrow, yellow, with ca. 9 or 10 bristles; toe somewhat pointed. Surstylus large, quadrate, with ca. 12 or 13 primary teeth in slightly convex row on entire length of distal margin and several setae on ventral inner surface. Cercus yellow, separate from epandrium; dorsal part oval, submedially slightly pubescent, with ca. 28 or 29 long bristles; ventral part narrow, elongate, apically with ca. 2 or 3 elliptical teeth.

Phallic organs (Figs. 22–23): Aedeagus curved ventrad, apically with bifurcated process, with numerous spinules on dorsal surface near base of subapical dilation, submedially finely wrinkled longitudinally; apodeme as long as aedeagus. Novasternum somewhat quadrate, with 1 pair of submedian spines at apices of hypandrium processes(?); median notch broadened basally.

♀ Reproductive organs: Ovipositor (Fig. 24) broad, slightly constricted on dorsosubapical margin, with ca. 17 marginal teeth; basal isthmus narrow, ca. 1/5 as long as ovipositor. Spermatheca (Fig. 25) ellipsoidal; introvert deep; duct expanded distally and subdistally.

Specimens examined. Burma: 7 ♂, 1 ♀, Pyin Oo Lwin, 30. XII. 1981–6. I. 1982, ex traps.

Distribution. Southern China; Burma (n. loc.): Pyin Oo Lwin.

Relationship. This species is very close to *D. histrio* MEIGEN, 1830, hardly distinguished from the latter in the external morphology other than genitalia.

Drosophila (Drosophila) trisetosa OKADA

(Figs. 26–28)

Drosophila (Drosophila) trisetosa OKADA, 1966, Bull. Brit. Mus. (Nat. Hist.), (Ent. Suppl.), 6: 99.

Aedeagus (Figs. 26, 27) ventrosubapically with 1 pair of acute, sclerotized projections. Spermatheca (Fig. 28) ellipsoidal; outer capsule small, less than 0.1 mm high; introvert shallow, less than 1/2 height of outer capsule; duct distally expanded.

Specimens examined. Burma: 1 ♂, Pyin Oo Lwin, 30. XII. 1981–6. I. 1982, ex trap; 11 ♂, 11 ♀, Mandalay, 26. XII. 1981–6. I. 1982, ex traps; 2 ♂, Mandalay, 31. XII. 1981, ex fallen fruits; 1 ♀, Mandalay, 25. XII. 1981, by sweeping at ditches; 1 ♂, 4 ♀, Shwebo, 2. I. 1982, by sweeping on forest floor and at streamside bushes; 20 ♂, 13 ♀, Rangoon, 17, 18, 21. XII. 1981, 10, 13, 14. I. 1982, by sweeping on forest floor and at bushes, streamside herbage stands, ditches and cliff shelters; 1 ♀, Rangoon, 10. I. 1982, ex fallen flowers.

Distribution. Nepal, India; Burma (n. loc.): Pyin Oo Lwin, Mandalay, Shwebo, Rangoon.

Drosophila (Drosophila) pagoda sp. nov.

(Figs. 29–32)

Diagnosis. Second oral bristle weak, short (ca. 1/3 length of vibrissa). First

to 4th abdominal tergites nearly entirely pale yellow, 2nd to 4th each with narrow, faint, medially interrupted, caudal band. Hypandrial process pubescent (Fig. 32). Anterior paramere absent (Fig. 30).

♂. Thorax length ca. 0.9 mm.

Head: Eye with pile. Antenna with 2nd joint brownish yellow and 3rd paler. Arista with 5 upper and 2 lower branches in addition to terminal fork. Frons ca. $1/2$ (0.50) as wide as head, yellow, anteriorly with a few frontal hairs; ocellar triangle brown on inside margins of ocelli; periorbits paler. Anterior reclinate orbital minute, ca. $1/5$ (0.20) length of posterior reclinate; proclinate ca. $5/8$ (0.62) length of posterior reclinate. Face pale yellow; carina high, narrow. Clypeus brownish yellow. Cheek pale yellow, ca. $1/7$ (0.14) as broad as maximum diameter of eye. Palpus pale yellow, with ca. 5 prominent setae on apical to lateral margin and numerous small setae on ventral surface.

Thorax: Mesoscutum, scutellum yellow. Thoracic pleura pale yellow, without dark patches or stripes. Humerals 2, subequal. Acrostichal hairs in 6 rows. Anterior dorsocentrals ca. $3/5$ (0.59) length of posteriors; cross distance of dorsocentrals ca. 2.4 length distance. Anterior scutellars ca. $7/8$ (0.87) length of posteriors; posteriors slightly nearer to anteriors than to each other. Sterno-index ca. 0.5; mid sternopleural somewhat weak, ca. $7/10$ (0.70) length of anterior sternopleural.

Legs pale yellow. Preapicals on all tibiae; apicals on fore and mid tibiae. Fore metatarsus as long as 3 succeeding tarsal joints together; mid and hind metatarsi slightly longer than 3 succeedings together.

Wing hyaline. Veins pale brown; cross veins clear. R_{2+3} slightly curved to costa at tip; R_{4+5} and M nearly parallel. C1-bristles 2; ventral one somewhat weak. Wing indices: C ca. 3.4, 4V ca. 1.8, 4C ca. 0.8, 5x ca. 1.5, Ac ca. 1.9, C3-fringe ca. 0.4. Halteres yellowish white; stalk darker.

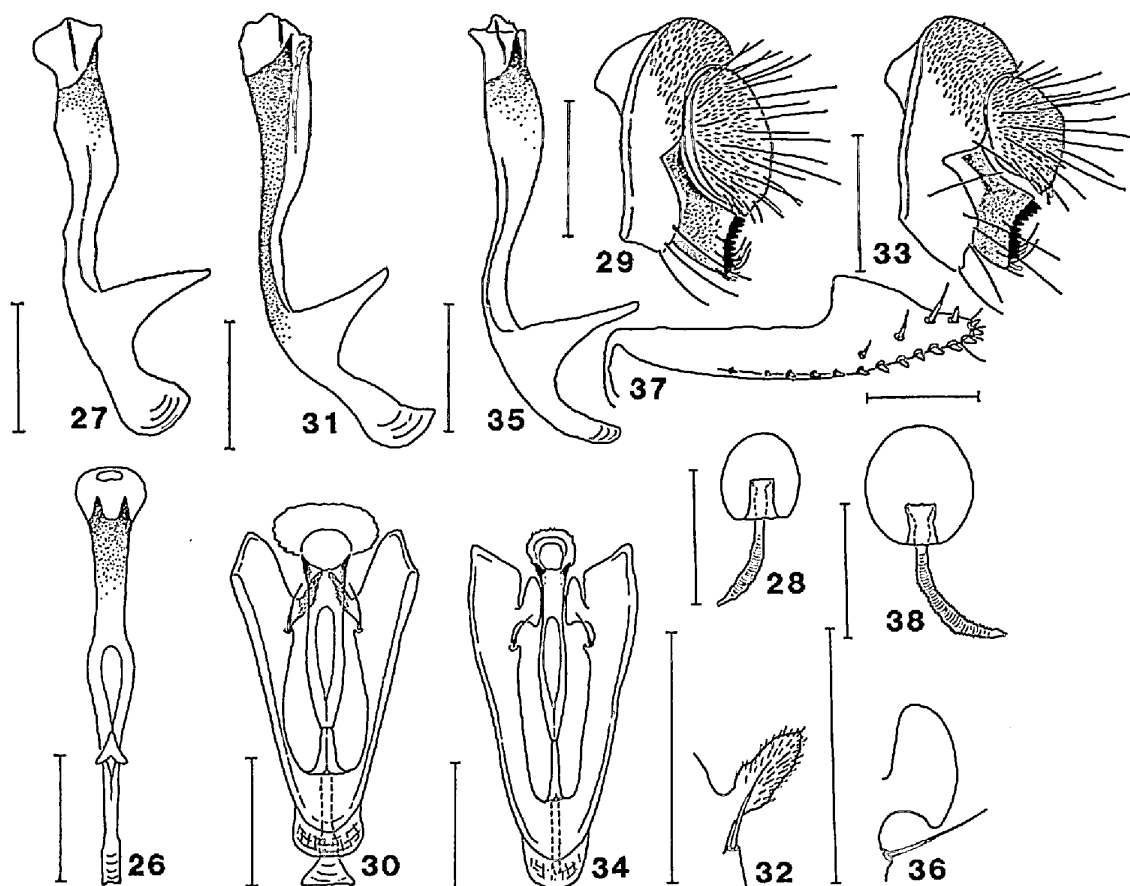
Abdomen: Fifth and 6th tergites each with broad, medially interrupted, brown, caudal band. Sternites pale yellow.

Periphallic organs (Fig. 29): Epandrium pubescent dorsally, narrow, truncate below, constricted at base of surstylus, with ca. 3 or 4 bristles on caudal margin of lower part. Surstylus quadrate, with ca. 9 primary teeth in slightly concave row on entire length of distal margin, 2 bristles on outer surface and several setae on ventral inner surface. Cercus oval, caudoventrally triangularly pointed, pubescent except for caudal margin, separate from epandrium, with ca. 31 long bristles.

Phallic organs (Figs. 30–32): Aedeagus slender, distally expanded like trumpet and with serrate lateral margins, laterosubapically with 1 pair of acute, sclerotized projections, basally with large vertical rod; apodeme short, ca. $1/3$ as long as aedeagus. Novasternum narrowly triangular, with 1 pair of submedian spines at bases of hypandrial processes; median notch deep, wide.

Holotype ♂, Burma: Mandalay, 26–30. XII. 1981, ex trap; in EHU.

Distribution. Burma: Mandalay.



Figs. 26-38. — 26-28, *Drosophila (Drosophila) trisetosa* OKADA, 1966; 29-32, *D. (D.) pagoda* sp. nov.; 33-38, *D. (D.) auriculata* sp. nov. — 29, 33: Periphallallic organs; 30, 34: phallic organs (ventral view); 26: aedeagus (ventral view); 27, 31, 35: ditto (lateral view); 32, 36: hypandrial process; 37: ovipositor; 28, 38: spermatheca. (Scale-line=0.1 mm.)

Relationship. This species somewhat resembles the foregoing species, *D. trisetosa*, and *D. sternopleuralis* OKADA et KUROKAWA, 1957, in ♂ genitalia, but clearly distinguishable from the latter two by the diagnostic characters.

Drosophila (Drosophila) auriculata sp. nov.

(Figs. 33-38)

Diagnosis. Dark brown caudal bands on 2nd to 6th abdominal tergites not extending anteriorly at lateral margins. Hypandrial process ear-like shaped, broad, smooth, basally constricted (Fig. 36). Anterior paramere absent (Fig. 34).

Some characters commonly seen in the foregoing species, *D. pagoda*, are not referred to in the following description.

♂, ♀. Body color generally darker, yellowish brown. Body length, ♀ ca. 2.4 mm (2.14-2.65). Thorax length, ♀ ca. 1.2 mm (1.10-1.37).

Head: Third antennal joint darker than 2nd. Arista with ca. 5 (5–6) upper and 3 lower branches. Frons ca. $1/2$ (0.48, 0.45–0.51) as wide as head; periorbits darker. Anterior reclinate orbital ca. $2/7$ (0.29, 0.27–0.32) length of posterior reclinate; proclinate ca. $5/9$ (0.53, 0.45–0.56) length of posterior reclinate. Cheek width ca. $1/10$ (0.09, 0.07–0.11) of maximum diameter of eye. Second oral stout, long, ca. $5/6$ (0.83, 0.76–0.88) length of vibrissa. Palpus with ca. 5 (3–6) prominent setae on apical to lateral margin, in ♂ with dense microsetae on ventral surface.

Thorax: Thoracic pleura with 3 obscurely demarcated, longitudinal, dark patches. Acrostichal hairs in 8 rows. Anterior dorsocentrals ca. $4/7$ (0.57, 0.52–0.64) length of posteriors; cross distance of dorsocentrals ca. 2.2 (2.02–2.43) length distance. Anterior scutellars slightly shorter (0.95, 0.90–0.98) than posteriors. Sterno-index ca. 0.5 (0.47–0.57); mid sternopleural stout, as long (0.98, 0.92–1.05) as anterior.

Legs: Fore metatarsus slightly shorter than 3 succeeding tarsal joints together; hind metatarsus as long as 3 succeeding together.

Wing slightly fuscous. Posterior cross vein cloud. C1-bristles 2, subequal. Wing indices: C ca. 3.2 (3.10–3.35), 4V ca. 1.8 (1.67–1.99), 4C ca. 0.8 (0.73–0.80), 5x ca. 1.3 (1.18–1.50), Ac ca. 2.2 (2.15–2.36), C3-fringe ca. 0.65 (0.58–0.70).

Periphallic and phallic organs (Figs. 33–36): Epandrium moderate in breadth, obliquely truncate below, with 1 bristle in middle part and 5 or 6 in lower part. Surstylus with 10 or 11 primary teeth. Cercus nearly entirely pubescent, with ca. 27 long bristles and tuft of 3 or 4 short bristles at caudoventral corner. Aedeagus irregularly serrate on distal margin.

♀ **Reproductive organs:** Ovipositor (Fig. 37) slender, apically much narrowing, with 3 (seldom 4) bristle-like discal and ca. 14 (13–15) marginal teeth; distal discal tooth especially long; basal ithmus short, narrow. Spermatheca (Fig. 38) ellipsoidal; outer capsule small, less than 0.1 mm high; introvert shallow, ca. $1/3$ height of outer capsule; duct distally expanded.

Holotype ♂, Burma: Pyin Oo Lwin, 30. XII. 1981, by sweeping on forest floor; in EHU. **Paratypes**, Burma: 4 ♀, same data as holotype; in EHU and author's collection (M. J. T.).

Distribution. Burma: Pyin Oo Lwin.

Relationship. This species is somewhat related to the foregoing species, *D. pagoda*, in having no anterior parameres, but clearly distinguishable from the latter by the differences in hypandrial process, epandrium, 2nd oral bristle and abdominal color pattern.

Drosophila (Drosophila) mutica sp. nov.

(Figs. 39–44)

Diagnosis. Dark brown caudal bands on 2nd to 5th abdominal tergites extending anteriorly at lateral margins. ♂ fore tarsus anteriorly with ca. 1 row of

recurved hairs. Aedeagus subapically without acute, sclerotized projections (Fig. 41). Hyandrial process slender, smooth, apically knob-like (Fig. 42). Anterior paramere present, fused to novasternum, with 1 prominent sensillum (Fig. 40). Ovipositor proximally somewhat broad, apically much narrowing, with 3 or 4 bristle-like discal teeth; distal discal tooth especially long (Fig. 43).

Some characters commonly seen in *D. pagoda* are not referred to in the following description.

♂, ♀. Body color generally brownish yellow. Body length, ♂ ca. 1.7 mm, ♀ ca. 2.3 mm (2.14–2.39). Thorax length, ♂ ca. 1.0 mm (0.89–1.06), ♀ ca. 1.1 mm (1.08).

Head: Arista with ca. 7 (6–7) upper and 3 lower branches. Frons narrower than 1/2 of head width (0.46, 0.43–0.47); periorbits darker. Anterior reclinate orbital ca. 2/7 (0.29, 0.26–0.31) length of posterior reclinate; proclinate ca. 5/9 (0.53, 0.47–0.56) length of posterior reclinate. Cheek very narrow, less than 1/10 of maximum diameter of eye (0.08, 0.08–0.09). Second oral ca. 3/4 (0.76, 0.73–0.80) length of vibrissa. Palpus with 2 prominent setae apically and laterally; ventral surface ordinary, with moderate number of small setae.

Thorax: Thoracic pleura with 3 distinct, longitudinal, dark brown patches. Lower humeral bristle longer. Acrostichal hairs in 8 rows. Anterior dorsocentrals ca. 2/3 (0.65, 0.59–0.68) length of posteriors; cross distance of dorsocentrals ca. 2.0 (1.86–2.15) length distance. Anterior scutellars slightly shorter (0.93, 0.90–0.96) than posteriors. Sterno-index ca. 0.6 (0.53–0.67); mid sternopleural stout, longer ($\times 1.24$, 1.14–1.34) than anterior.

Legs: Fore metatarsus slightly shorter than 3 succeeding tarsal joints together; mid and hind metatarsi as long as 3 succeeding together.

Wing slightly fuscous. Posterior cross vein cloud. C1-bristles 2, subequal. Wing indices: C ca. 3.3 (2.71–3.70), 4V ca. 1.6 (1.48–1.75), 4C ca. 0.7 (0.61–0.86), 5x ca. 1.4 (1.23–1.66), Ac ca. 2.1 (1.96–2.17), C3-fringe ca. 0.6 (0.55–0.65).

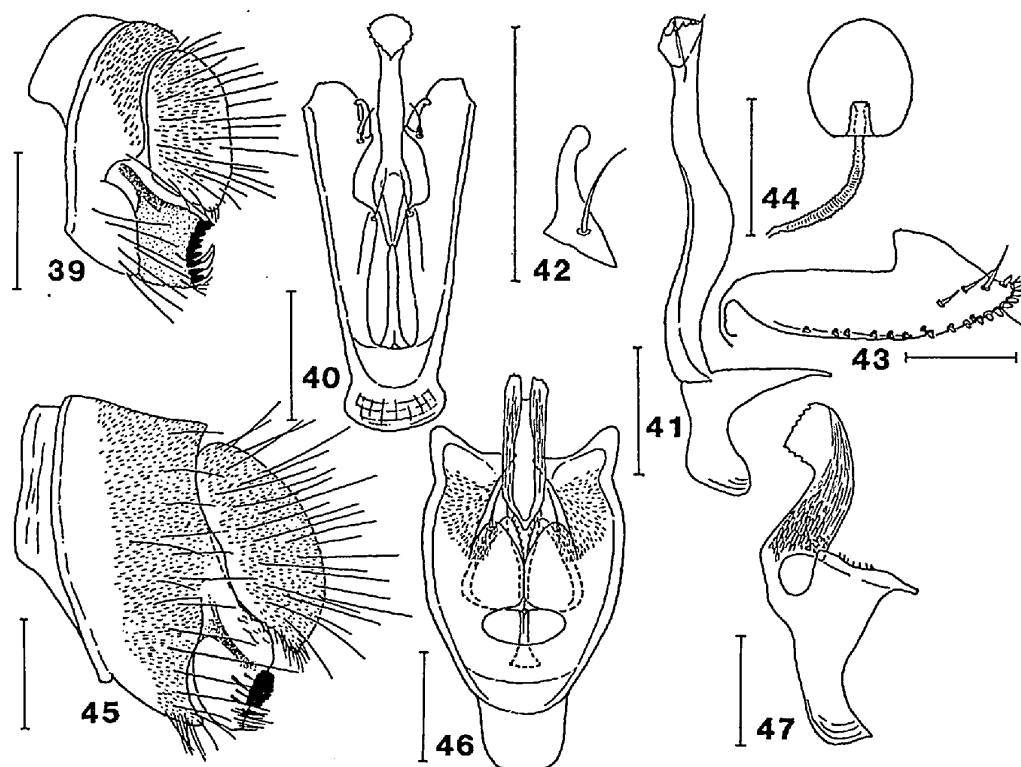
Abdomen: Sixth tergite entirely dark brown in ♂, with broad, medially uninterrupted, dark brown, caudal band in ♀.

Periphallic and phallic organs (Figs. 39–42): Epandrium with 1 bristle in middle part and 7 or 8 in lower part, obliquely truncate below; toe somewhat pointed. Surstylus with ca. 10 primary teeth and ca. 3 (2–4) bristles on outer surface. Cercus with ca. 30 long bristles and tuft of ca. 3 short bristles at caudoventral corner. Aedeagal apodeme ca. 1/4 as long as aedeagus. Novasternum somewhat quadrate, basally narrowing; median notch moderate in width.

♀ Reproductive organs: Ovipositor (Fig. 43) with ca. 18 (16–19) marginal teeth. Spermatheca (Fig. 44) ellipsoidal; outer capsule small, less than 0.1 mm high; introvert small, with depth less than 1/3 height of outer capsule.

Holotype ♂, Burma: Pyin Oo Lwin, 30. XII. 1981–6. I. 1982, ex trap; in EHU. Paratypes, Burma: 1 ♂, 2 ♀, same data as holotype; in EHU and M. J. T.

Distribution. Burma: Pyin Oo Lwin.



Figs. 39–47. — 39–44, *Drosophila (Drosophila) mutica* sp. nov.; 45–47, *D. (D.) repletoides* Hsu, 1943. — 39, 45: Periphallallic organs; 40, 46: phallic organs (ventral view); 41, 47: aedeagus (lateral view); 42: hypandrial process; 43: ovipositor; 44: spermatheca. (Scale-line=0.1 mm.)

Relationship. This species is somewhat close to *D. sternopleuralis*, but clearly distinguishable from the latter by the differences in ♂ fore tarsus, aedeagus, hypandrial process and ovipositor.

Ungrouped Species

Drosophila (Drosophila) repletoides Hsu

(Figs. 45–47)

Drosophila (Drosophila) repletoides Hsu, 1943, Kwangsi Agric., 4: 155; WHEELER, 1981, Genet. Biol. *Drosophila*, 3a: 49.

Drosophila (Drosophila) tumiditarsus TAN, Hsu et SHENG, 1949, Univ. Texas Publ., (4920): 205.

Drosophila (Drosophila) hayashii PATTERSON et WHEELER, 1949, Univ. Texas Publ., (4920): 229 (nomen nudum).

Drosophila (Drosophila) chinoi OKADA, 1956, Syst. Study, 162.

♂. Thorax length ca. 1.2 mm.

Head: Arista with 3 upper and 2 lower branches in addition to terminal fork. Anterior reclinate orbital ca. 5/9 (0.53) length of posterior reclinate; proclinate ca.

7/10 (0.69) length of posterior reclinate.

Thorax: Anterior dorsocentrals ca. 7/9 (0.77) length of posteriors; cross distance of dorsocentrals ca. 1.8 length distance. Anterior scutellars ca. 4/5 (0.79) length of posteriors; posteriors nearer to each other than to anteriors.

Legs: Fore metatarsus slightly longer than next tarsal joint; mid and hind metatarsi slightly longer than 2 succeeding joints together.

Wing: Veins yellowish brown. R_{2+3} slightly curved to costa at tip; R_{4+5} and M nearly parallel. Ac-index ca. 2.1.

Periphallic organs (Fig. 45): Epandrium pubescent except for anterior margin; heel prominent. Surstylus with ca. 4 stout, short bristles on outer surface and numerous setae on caudoventral margin. Cercus nearly entirely pubescent, with tuft of short bristles around somewhat pointed caudoventral corner.

Phallic organs (Figs. 46–47): Aedeagus serrate on apical margin, with minute elongated conical processes on proximal lateral surface and longitudinal wrinkles on submedian to distal ventral surface. Novasternum laterally pubescent, with 1 pair of submedian spines at apices of triangular hypandrial plates.

Specimen examined. Burma: 1 ♂, Pyin Oo Lwin, 30. XII. 1981–6. I. 1982, ex trap.

Distribution. Japan, southern China; Burma (n. loc.): Pyin Oo Lwin.

Drosophila (Drosophila) penispina GUPTA et SINGH

Drosophila (Drosophila) penispina GUPTA et SINGH, 1979, Entomon, 4: 167.

♀. Mid and hind tarsi laterally with row of minute cuneiform black bristles.

Specimen examined. Burma: 1 ♀, Pyin Oo Lwin, 30. XII. 1981–6. I. 1982, ex trap.

Distribution. India; Burma (n. loc.): Pyin Oo Lwin.

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